

## **USACE Omaha District - Horizontal Directional Drilling Criteria**

**Date:** \_\_\_\_\_

**Project:** \_\_\_\_\_

The proposed horizontal directional drilling project shall incorporate the following minimum requirements:

### **1. Installation Plan**

Prior to construction, an installation plan shall be submitted for review and approval. This plan shall include the following:

1.1. Experience. Description of the drill crew's experience with a list of completed projects including location, product diameter, and length of installation.

1.2 Conduit. Description of the conduit being installed including material type, length, diameter and wall thickness. The plan shall show how the conduit will be assembled and that the completed product has the strength to withstand installation loads and long term operating loads.

1.3. Drawings. Drawings showing the plan location of the entrance and exit pits and the drill path with respect to the flood protection system and other physical features.

Drawings showing the drill path profile of the proposed conduit. This alignment shall include all curve geometry, depth of cover, and elevations along the alignment. The plan shall identify the diameter of the pilot hole and the final reamed hole and how many reaming passes will be made.

1.4. Drilling Equipment. Description of the drill rig and supporting equipment that will install the conduit and proof that it has the capability to install the proposed conduit. The plan shall identify the proposed location of the drill rig, support vehicles, and working areas.

1.5. Drilling Fluid. Description of the drilling fluid including the composition (density, viscosity, etc) of the drill mud and how it will be used - continuously for removal of cuttings, continuously for mixing cuttings into slurry, or intermittently for lubrication purposes. The plan shall state the proposed operating pressures and flow rates of the drilling mud system. The response plan, should there be a hydrofracture or inadvertent return or loss of circulation, shall also be described.

Description of the measures the driller will take to prevent the drill bit from getting stuck and what methods will be undertaken to retrieve a drill bit should it become stuck.

A drilling fluid management plan describing how cuttings and all drilling mud will be contained, collected, recycled (if applicable), transported, and disposed of.

1.6. Tracking System. Description of the tracking system that the driller will use to track the progress of the pilot hole. The plan shall describe how the driller will regain the desired line and grade if the drill bit veers off the design alignment. The plan shall also describe the accuracy and resolution of the tracking system and how it will be calibrated at the beginning of the work.

1.7 Existing Utilities. The plan shall identify the location, elevations and proposed clearance between the drill path and all existing underground and above-ground utilities. The installation contractor shall be responsible for locating all existing utilities. The local "One Call" system shall be contacted to conduct on-site verification of existing utilities prior to construction. Liability for damage to existing utilities shall be the responsibility of the installation contractor.

## **2. Horizontal Directional Drilling Criteria**

2.1. Pressurized Pipes. A positive shut-off shall be provided on both sides of the levee system for all pressurized pipes.

2.2. Drill Path Depth. The top of the HDD drill path shall be a minimum of 30 feet beneath the land-side and riverside toes of any levee and a minimum of 30 feet below the bottom of the waterway channel or any future dredge line. During backreaming, the driller shall take care not to heave surface soils where the soil cover over the reaming tool is a minimum.

2.3. Set-Back Distance.

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Note: A 300-foot set-back distance is desirable for all HDD installations. If space constraints prevent use of the full set-back distance, this distance may be reduced for small flood protection projects where the duration of high water within the levee system is anticipated to be short in duration. The minimum acceptable set-back distance should never be less than 150 feet.

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Unless otherwise approved, entry and exit points for HDD drill paths shall be set back a minimum of [300] [\_\_\_\_\_] feet from the outside toe of the levee system.

2.4. Hydrofracture Prevention. Mud flow rates and pressures shall be monitored to minimize the potential for hydrofracturing. The plan shall state the maximum allowable residual mud pressures that the borehole wall can tolerate without hydrofracturing. During drilling, the actual residual pressure in the return mud shall be measured at a point no further than 20-feet behind the drill bit. The measured mud pressures shall be no more than one-half of the calculated maximum.

2.5. Grouting

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Note: The geologic cross-section at a site will typically consist of a layer of fine grained soil overlying a coarser grained layer of soil. Specify the length of grouting

so that the annular space within the overlying fine-grained blanket is grouted. This prevents a preferred seepage path from developing.

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Any annular space between the wall of the borehole and the pipeline must be grouted shut for a minimum distance of [100] [\_\_\_\_\_] feet along the completed conduit from the end of the conduit at the entrance and exit pits. Grouting of the annular space with a bentonite or pozzolyn grout shall be performed to expel the semifluid mixture of bentonite, soil, and water with a grout material that will provide a barrier against seepage flow along the annulus. The grout proposed for use shall be described in the work plan.

2.6. Fiber-optic Conduits. Conduits that carry fiber-optic cables and other types of transmission lines shall be plugged on both sides of the levee system to prevent the conduit from becoming a potential seepage path. A description of how the ends of the conduit will be sealed shall be included in the installation plan.

2.7. Damage. Any damage to the levee system during the HDD process shall be repaired in accordance with USACE requirements at no cost to the government. Repairs shall be approved by USACE. As part of this submittal, the contractor shall submit proof of comprehensive general liability insurance covering damage to existing privately owned or publicly owned structures and utilities.

2.8. Backfill. The pit at exit and entry points shall be backfilled and compacted in 8-inch loose lifts using soils classified as clay (CL or CH) in accordance with ASTM D 2487. Soil shall be compacted with approved mechanical means to a dry density greater than 95% of ASTM D 698 maximum.

2.9. Abandoned Drill Paths. Any misdirected or unsuccessful drill paths must be grouted shut with a cement-bentonite grout.

2.10. Notification. USACE shall be contacted a minimum of 7 days prior to the initiation of HDD activities.

### **3. As-Built Drawings**

A copy of the final as-built drawings and all pressure measurements shall be submitted to USACE for incorporation into project drawings. The as-built drawings shall have a calculated table with x, y, and z positions that are tied to the state plane coordinates and National Geodetic vertical datum determined at thirty foot intervals along the alignment. The as-built drawings shall also be annotated with maximum drilling pressure, areas of pressure drop or fluid loss along the drill path during the pilot drill, and other pertinent details. As-built drawings shall be submitted to the following address:

U.S. Army Corps of Engineers  
Omaha District (CENWO-OD-E)  
1616 Capitol Ave, Ste 9000

Omaha, NE 68102-9000

**4. Point of Contact**

Please contact \_\_\_\_\_ at telephone number (\_\_\_\_) \_\_\_\_-\_\_\_\_ with questions about the above criteria.